PATENT COOPERATION TREATY

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

To:

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in its capacity as elected Office

Date of mailing (day/month/year) 27 February 1997 (27.02.97)	
International application No. PCT/SE96/00865	**Applicant's or agent's file reference** P32984PCOO
International filing date (day/month/year) 28 June 1996 (28.06.96)	**Priority date** (day/month/year) 07 July 1995 (07.07.95)
Applicant LAUKKANEN, Risto	

1. The designated Office is hereby notified of its election made:

[X] in the demand filed with the International Preliminary Examining Authority on:

07 February 1997 (07.02.97)

[ ] in a notice effecting later election filed with the International Bureau on:

2. The election [X] was

[ ] was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

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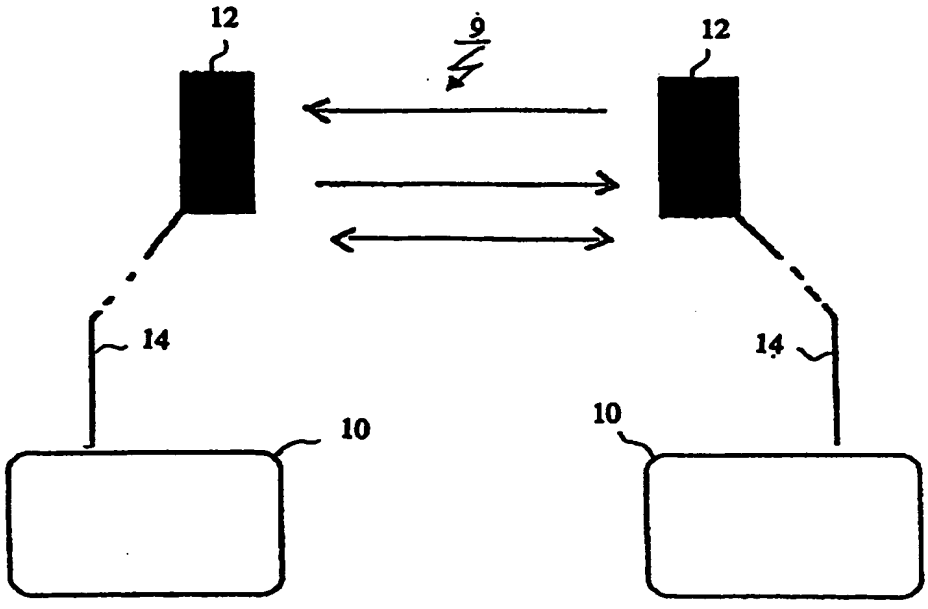
(54) Title: ARRANGEMENT FOR WIRELESS COMMUNICATIONS



(57) Abstract

The invention relates to an arrangement (12) for direct wireless communication with inbuilt integrated electronic intelligence, said arrangement (12) being connected to a host unit (10) via a connection means (14). More specifically, the invention relates to an arrangement with relieves a connected host unit from context switching, unnecessary processing of interference/disturbance signals and work-demanding interruption routines in the wireless interchange of information between host units (10) via arrangements (12).

ARRANGEMENT FOR WIRELESS COMMUNICATIONS

FIELD OF INVENTION

The present invention relates to a wireless communications arrangement or system with inbuilt integrated electronics, said arrangement being connected to a host unit via connection means. More specifically, the invention relates to an arrangement or system which relieves a connected host unit from context switching procedures, unnecessary processing of disturbance and interference signals and work-demanding interruption routines in the direct wireless exchange of information at relatively short distances between host units via arrangements in accordance with the invention.

DESCRIPTION OF THE BACKGROUND ART

Known arrangements for wireless communications with direct signal transmission between communications units - i.e. in the absence of intermediate active transmission systems such as mobile telephone systems for processing or forwarding signals, such as PCs or other host computers, printers, facsimile equipment or other communications units - include equipment for the wireless transmission of data, for instance IR equipment, radio equipment or ultrasonic equipment. This equipment is, in turn, controlled and operated by communications protocol, error correcting routines and possibly routines for signal disturbance filtration of wireless transmitted signals, these routines and protocols being present in said communications units.

It will be understood that, for instance, a mobile telephone system is not accessible for the transmission of information between, e.g., arrangements where communication shall often be instantaneous with large quantities of data and at high speeds. It would untenable to expect access to a mobile telephone system for transmission purposes. Often no unoccu-

pied channels are available and the mobile telephone traffic varies throughout a calendar day.

Protocol, routines and hardware integrated in communications units for wireless transmission require a high degree of computer power, which steals memory space and time for other processing in communications units; received signals shall often be converted to an ASCII code or other standard alphanumerical character codes with control characters.

Furthermore, in communications units with integrated wireless communication the receiver of wireless transmitted signals operates continuously with the interpretation of outer disturbances, interferences, and noise, wherewith the communications unit or host unit operates continuously and unnecessarily with interpretation, even though the signals are shown to be noise. Such disturbance sources and noise sources may, for instance, consist of the remote controls of other apparatus, such as TV apparatus, lighting controls, cordless telephones, etc.

The aforesaid circumstances constitute a problem in existing known wireless communication arrangements or systems with respect to rapid and effective transmission of information.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide an effective solution to the aforesaid problem with regard to the rapidness and effectiveness of direct communication between communications units in the absence of processing via intermediate, active link systems which forward signals in the digital transmission of data between communications units.

A first alternative embodiment of the invention involves using means for signal conversion in the arrangement solely

for filtering disturbances in received wireless-transmitted signals (pulses), wherein communications protocol is included in the host unit to which the arrangement is connected.

In a second alternative embodiment of the invention, there is provided a separate external arrangement which in wireless transmission performs all signal processing externally of a host unit, wherein only signals between the host unit and the inventive arrangement are transmitted in the form of alphanumerical codes with control characters, preferably binary characters.

An object of the invention is also to connect an inventive arrangement to a host unit via standard host unit input and output ports.

Yet another object of the invention is to enable a host unit connected to an inventive arrangement to maintain communication between other external units in a conventional manner, for instance via local network connections through the medium of connection means, therewith enabling the wireless transmission to be applied without disturbing or delaying other communication, when applicable.

The objects of the invention are achieved with an arrangement for wireless communication having inbuilt integrated electronics and being connected to a host unit via connection means.

The arrangement includes process-controlled integrated electronics with transmitter means and receiver means, said means functioning to establish a direct transmission link with other means for wireless pulse transmission and wireless pulse reception respectively, means for filtering out disturbance data and noise, signal conversion means, and input and output ports for connection to the host unit through the medium of connection means. The arrangement

including said filter means operates as a buffer to the host unit, insomuch that the host unit receives and processes via said connection means solely data intended for the host unit.

In one embodiment of the invention, the arrangement may include protocol control means for transmitting and receiving data between integrating devices and between the host unit, wherein the arrangement converts received wireless-transmitted data to an alphanumeric character code optionally with control characters for transmission to the host unit, or converts alphanumeric character codes received from the host unit and possibly including control characters to pulses for wireless transmission. The arrangement thus operates autonomously from the host unit concerned with regard to wireless transmission and its signal conversion.

When a host unit has an inventive arrangement connected thereto, the unit will use the arrangement on an intermittent basis and other existing network connections continuously, or, alternatively, the unit will determine when and to which extent the arrangement is used in relation to other existing network connections.

Alternatively, the arrangement may constitute the sole communication path of a host unit for external communication.

It is preferred that the arrangement is portable when not integrated in a host unit, and that the arrangement can be connected to a host unit via standard I/O ports of said unit and said arrangement without needing to supplement the host unit with wireless communication software.

BRIEF DESCRIPTION OF THE DRAWING

The present invention will now be described in more detail with reference to the accompanying drawing, in which

Fig. 1 illustrates schematically a communications link for the wireless transmission of digital data with an inventive arrangement in the form of a black box; and

Fig. 2 is a block schematic illustrating a communications link for the wireless transmission of digital data in accordance with the present invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

With the intention of solving the aforesaid problems and achieving the aforesaid objects by means of the present invention, there is used an arrangement which operates completely or partially externally of host communications units, as described below.

In this regard, Fig. 1 illustrates schematically a communication link 9 for the direct wireless transmission of digital data, having two inventive arrangements 12 in the form of black boxes connected to a communications unit 10 through the medium of connection means, in the illustrated case a data cable 14.

By direct transmission is meant here that no intermediate active systems receive transmitted signals and forward said signals to intended receivers. Active systems such as mobile telephone systems involve the transmission of data via intermediate systems, such as base stations and switching centres for forwarding signals to the receiver, which also involves extra costs for using the mobile telephone system. The present invention relates, e.g., to two computers which are often located at a relatively short distance apart and which communicate with each other, often in the same room, and consequently direct communication between the computers via an active intermediate system or an active intermediate link would only incur unnecessary costs in respect of equipment, subscription fees, etc., and considerably higher

loading of the active system, which often has a limited number of channels. Thus, transmitter and receiver in communicating arrangements according to the invention establish an individual direct communications link which can use passive reflectors for transmission, e.g. walls, ceilings, roofs, parabolic reflectors, mirrors, etc. The present invention provides practically immediate access to a data transmission, particularly when the access times are compared with the access times applicable in mobile telephone systems. It will be understood that a mobile telephone system is not accessible for the transmission of information between, e.g., devices where communication shall often take place instantaneously and with large quantities of data and at high speeds. It would be untenable to expect access to a mobile telephone system for transmission purposes. Often, no unoccupied channels are available and the traffic over mobile telephone systems varies throughout a calendar day.

Furthermore, indoor coverage for mobile telephone systems is highly doubtful, particularly in windowless spaces. The present invention also provides an improvement in existing wireless transmission systems that do not utilize an active intermediate system.

The connection means may be a data cable with standard electric contacts for mounting base connections, soldered for integrated connection of the host unit 10, adapters for direct, integrated, connection to a host unit 10, and so on. The arrangement 12 may thus also be integrated in a host unit in a manner known to the skilled person, via connection means 14. The link 9 is intended for the transmission of data between the arrangements 12, as indicated by the unidirectional arrows in Fig. 1. The distance between the arrangements 12 may vary between about 0.5 m to several 100 meters, indicated by the two-directional arrows in Fig. 1. The arrangements 12 need not necessarily be directly visible to one another, and reflectors (not shown), mirrors or other

reflective surfaces may be used to reflect light, radio waves, ultrasonic signals, etc.

The wireless transmitter units may be directed more or less divergently adapted or omnidirectional.

Communication between the arrangements 12 may be two-directional or unidirectional in both directions, such as duplex, full duplex and simplex communication.

The two arrangements 12 both transmit and receive data in pulse form, such as light, radio or ultrasonic pulses, depending on the wireless transmission technique used. Although infrared light (IR light) is the most obvious choice with regard to light pulses, this does not exclude the use of other optical light transmitting techniques.

The arrangements 12 are constructed to filter-out transmission disturbances and noise via an internal filtering program or via internal hardware, so that erroneous information will be sorted out or errors corrected with the aid of typical codes for the transmission of wireless digital data, for instance with the aid of known CRCs (Cyclic Redundancy Codes) for error-free transmission of received data to host units 10.

A host unit 10 may comprise a PC, another host computer, or communications units that include integrated processor-based electronics for communication with other units. These communication units 10 are herewith able to maintain the transmission of information in a typical manner via cables or other connection means in, e.g., a network of units 10, wherein a connected arrangement 12 can be used for the intermittent transmission of data when so required. This last mentioned intermittent use of a connected arrangement may be due to a number of reasons, for instance the transmission of data to another network, the replacement of modem transmis-

sion between freestanding PC units, the use of specific peripheral equipment control functions, etc.

The exchange of information between external arrangements 12 and host unit 10 through data cable 14 may be effected, e.g., in a serial RS232 channel or some other suitable standard serial or parallel data channel. The cable 14 is connected between host unit 10 and arrangement 12 via one or more standard serial or parallel input and output ports (I/O ports).

Reference is now made to Fig. 2, which is a block schematic illustrating a communications link 9 having two arrangements 12 for the wireless transmission of digital data in accordance with the present invention.

The inventive arrangement 12 is comprised of integrated processor-based 20 electronics and the central processor unit (CPU) has integrated therein filter means 26, software or hardware for data flow filtration, error correction and protocol handling. The CPU (central processor unit) has a transmitter means 22 connected to a receiver means 24 via the filter means 26. Naturally, the filter means 26 may be a device located externally of the CPU and connected between said unit 20 and the receiver means 24. The CPU is also connected to signal conversion means 28 which converts signals to a form intended for the transmission of data between arrangements 12 and host units 10 respectively.

Although not shown, the CPU includes typically I/O ports for communication on a worldwide basis and to which the cable connection 14 is connected via an appropriate standard mounting base (not shown).

Units and means and the communication technology employed therebetween, this technology being included in the arrangement 12, are well known in the present technical field and

do not therefore need to be described in detail in order for one skilled in this art to practice the invention. On the other hand, the combination of means and units localized in an arrangement 12 for an external host unit 10 is unique, wherein the host unit 10 in one embodiment greatly relieves time-consuming transmission and reception tasks that load interruption routines and context switching (data term for switching between working routines) for CPU-based communications units 10, while these tasks are totally obviated in a second embodiment. In a first embodiment of the invention, the arrangement 12 includes the filter means 26 having filtering protocol but lacks the communications protocols that host units 10 usually communicate with externally, in other words host units must continue to include such protocol in order to satisfy the object of the invention.

The means 26 for filtering-out disturbing or interfering data constitutes an essential part of the invention. It will be understood that a wireless communication unit 10 which communicates in accordance with present techniques is constantly required to interpret interference noise from apparatus in its surroundings, such as noise from TV remote controls, radio transmitting apparatus, e.g. mobile telephones, etc. This requires the unit 10 to interpret continuously signals arriving at the receiver and deciding whether the data is relevant data or interference data. An arrangement 12 which includes filter means 26 for filtering-out disturbance data and interference data completely relieves a connected host unit 10, which is then able to rest while awaiting the arrival of relevant, filtered data.

In another embodiment, the arrangement 12 also includes the aforesaid communications protocols that a host unit connected to the arrangement 12 will normally include and which thus operate fully autonomously from concerned host units 10 with respect to the data processing of transmission and reception signals.

An arrangement 12 according to the second embodiment includes protocol handling of data for known alphanumerical character codes with control characters in the arrangement 12. Thus, a host unit is able to send and receive, via data cable 14, alphanumerical text files with control characters, e.g. ASCII characters, directly to/from the external arrangement without needing to process received data more than is required for internal data processing reasons.

As before described, host units 10 are still able to communicate via conventional network connections, wherein specific applications may enable parts of the network communication to take place via the external wireless communication arrangement 12 between host units 10 when necessary.

When a host unit 10 wishes to communicate with another host unit, information is sent, e.g., to the input port of said other host unit via a serial RS232 channel. The transmitting arrangement converts the information arriving from its host unit into a pulse train of electromagnetic signals, or in applicable cases into pulse trains of acoustic signals and sends the pulse trains via the wireless link to a similar arrangement 12 which is the target of said communication. The received pulse trains arrive at the filter means 26 via receiver 24, for filtration of interference and noise and for checking that the information is correct. Indeterminable information received is filtered-out and never reaches the host unit 10. In this regard, the two arrangements 12 communicating with host units have an internal data transmission protocol. The modus operandi of the arrangements 12 is therefore unique and does not incur additional load on the connected host units 10, wherein any additional work required for wireless data transmission is handled by the link 9 that includes the arrangements 12.

When the arrangement 12 is constructed in accordance with the second alternative embodiment, the arrangement will prefera-

bly be portable and capable of being connected to a host unit 10 via the standard I/O ports of the host unit and the arrangement 12, without needing to supplement the host unit with wireless communication software.

It will be understood that the aforedescribed embodiments are not intended to limit the scope of the present invention, but merely to illustrate exemplifying applications to one of normal skill in this particular technical field. Accordingly, the number of embodiments conceivable to one skilled in this art is only restricted by the scope of the following Claims.

CLAIMS

1. An arrangement (12) for wireless communication having inbuilt integrated electronics and connected to a host unit (10) via connection means (14), characterized in that the arrangement (12) includes processor-controlled (20) integrated electronics with transmitter means (22) and receiver means (24), wherein said means (22, 24) establish a direct transmission link (9) with other means (22, 24) for wireless pulse transmission and wireless pulse reception respectively, filter means (26) for filtering out disturbance data, interference data, and noise, signal conversion means (28), and input ports and output ports for connection to the host unit (10) via said connection means (14), and wherein the arrangement including said filter means (26) functions as a buffer against the host unit (10) by virtue of the host unit receiving and processing solely data intended therefor, via said connection means (14).

2. An arrangement according to Claim 1, characterized in that the arrangement includes protocol control for data transmission and reception between integrating arrangements (12) and between host units (10), wherein the arrangement (12) converts the received wireless-transmitted data to an alphanumerical character code, which may include control characters for transmission to the host unit, and converting an alphanumerical character code received from the host unit and possibly including control characters into pulses for wireless transmission, wherein the arrangement (12) operates autonomously from the host unit (10) in question with regard to said wireless transmission and its signal conversion (28).

3. An arrangement according to Claims 1 and 2, characterized in that the arrangement (12) with connected host unit (10) is used on an intermittent basis; and in that the host unit (10) continuously uses other existing network connections.

4. An arrangement according to Claims 1 and 2, characterized in that the connected host unit (10) decides when and to what extent the arrangement (12) is used in relation to other existing network connections.

5. An arrangement according to Claims 1 and 2, characterized in that the arrangement (12) constitutes the sole communication path for external communication of the host unit (10).

6. An arrangement according to any one of Claims 2-5, characterized in that the arrangement is portable and can be connected to a host unit (10) via standard I/O ports on said host unit and said arrangement (12) without needing to supplement the host units with wireless communication software.

7. An arrangement according to any one of the preceding Claims, characterized in that the arrangement is integrated in a host unit via connection means (14).

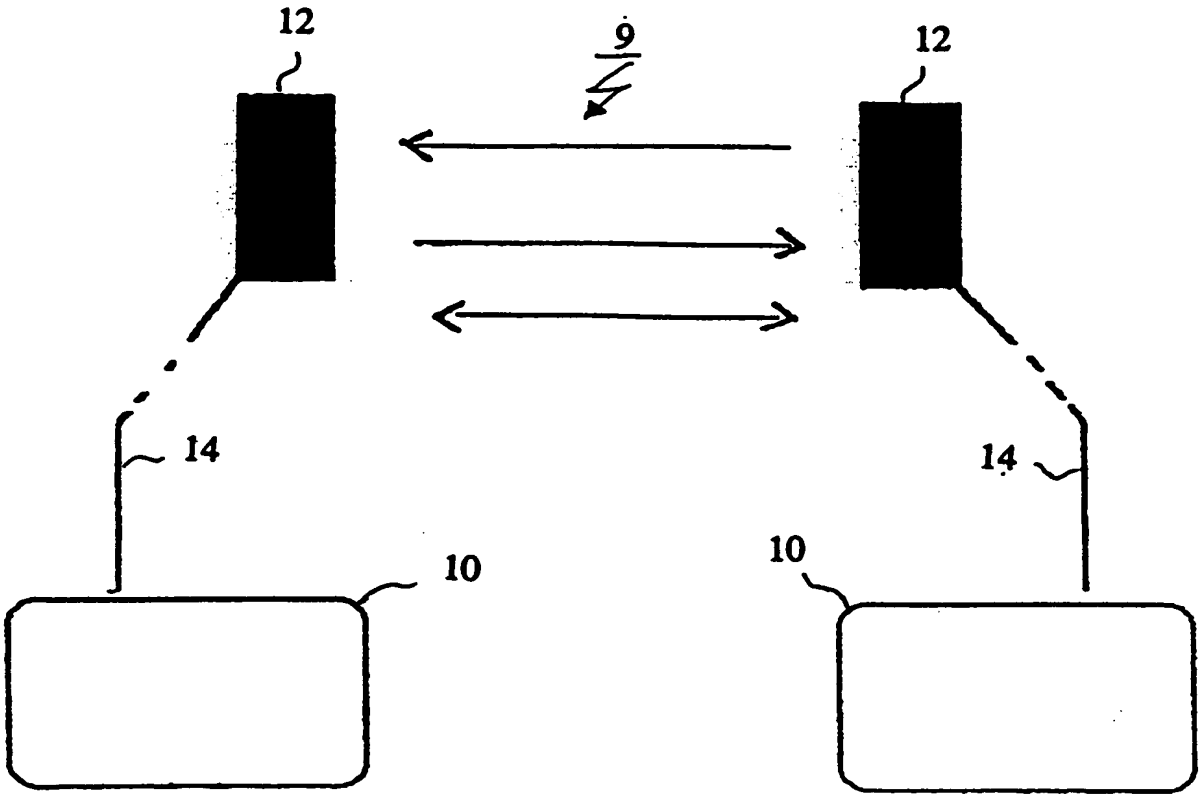

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Fig. 1

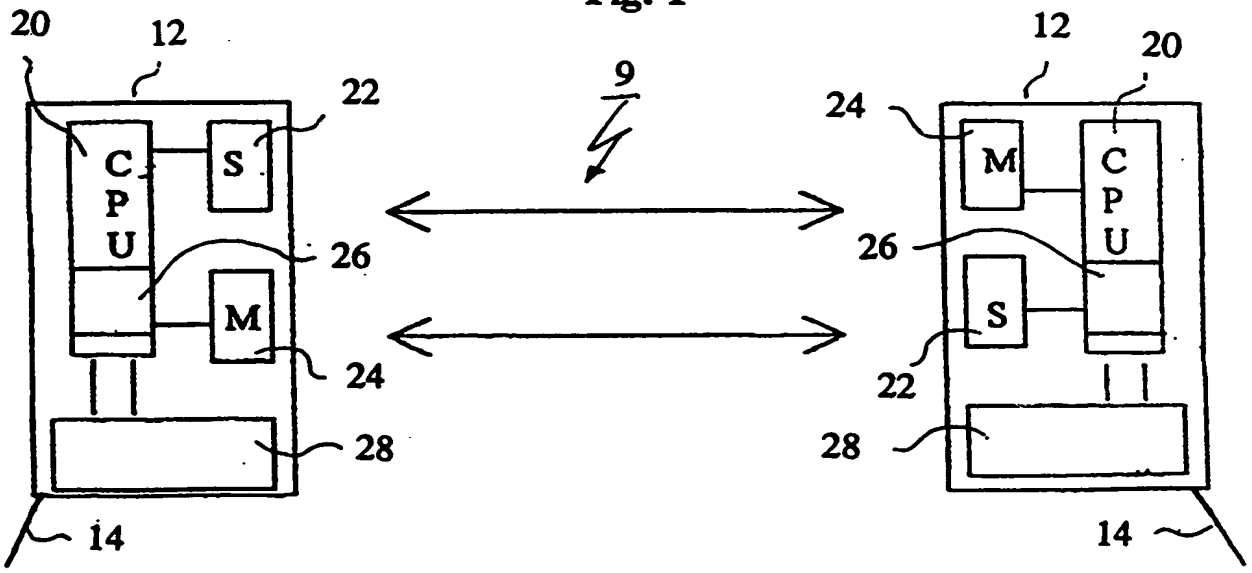
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Fig. 2

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE 96/00865

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: H04Q 7/32, H04M 11/06
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: H04M, H04Q, H04B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPAT JAPIO

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 555992 A1 (NOKIA MOBILE PHONES LTD.), 18 August 1993 (18.08.93), see the claims	1-7
X	EP 0632636 A1 (HAGENUK GMBH), 4 January 1995 (04.01.95), column 2, line 43 - column 3, line 32	1-7
A	EP 0655873 A2 (NOKIA MOBILE PHONES LTD.), 31 May 1995 (31.05.95), page 3, line 34 - page 4, line 4, abstract	1-7
P,A	EP 0669746 A1 (SIEMENS AKTIENGESELLSCHAFT), 30 August 1995 (30.08.95), column 3, line 56 - column 5, line 3	1-7

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
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"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
13 November 1996	19 -11- 1996
Name and mailing address of the ISA/ Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86	Authorized officer Göran Magnusson Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT

Information on patent family members

28/10/96

International application No.
PCT/SE 96/00865

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP-A1- 555992	18/08/93	NONE	
EP-A1- 0632636	04/01/95	NONE	
EP-A2- 0655873	31/05/95	FI-A- 935347	31/05/95
EP-A1- 0669746	30/08/95	DE-A,C- 4406507	31/08/95

19 -08- 1996

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REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

For receiving Office use only

International Application No. PCT/SE95/00865

International Filing Date 28 -06- 1996

The Swedish Patent Office
PCT International Application

Name of receiving Office and "PCT International Application"

Applicant's or agent's file reference (if desired) (12 characters maximum) P32984PC00

Box No. I TITLE OF INVENTION

ARRANGEMENT FOR WIRELESS COMMUNICATIONS

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This person is applicant for the purposes of: ☐ all designated States ☒ all designated States except the United States of America ☐ the United States of America only ☐ the States indicated in the Supplemental Box

Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

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This person is:

☐ applicant only

☒ applicant and inventor

☐ inventor only *(If this check-box is marked, do not fill in below.)*

State *(i.e. country)* of nationality: SE

State *(i.e. country)* of residence: SE

This person is applicant for the purposes of: ☐ all designated States ☐ all designated States except the United States of America ☒ the United States of America only ☐ the States indicated in the Supplemental Box

☐ Further applicants and/or (further) inventors are indicated on a continuation sheet.

Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The person identified below ~~is hereby~~/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as: ☒ agent ☐ common representative

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

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☐ Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

Box No.V DESIGNATION OF STATES

The following designations are hereby made under Rule 4.9(a) *(mark the applicable check-boxes: at least one must be marked)*:

Regional Patent

☒ AP **ARIPO Patent:** KE Kenya, LS Lesotho, MW Malawi, SD Sudan, SZ Swaziland, UG Uganda, and any other State which is a Contracting State of the Harare Protocol and of the PCT

☒ EA **Eurasian Patent:** AZ Azerbaijan, BY Belarus, KZ Kazakstan, RU Russian Federation, TJ Tajikistan, TM Turkmenistan, and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT

☒ EP **European Patent:** AT Austria, BE Belgium, CH and LI Switzerland and Liechtenstein, DE Germany, DK Denmark, ES Spain, FR France, GB United Kingdom, GR Greece, IE Ireland, IT Italy, LU Luxembourg, MC Monaco, NL Netherlands, PT Portugal, SE Sweden, and any other State which is a Contracting State of the European Patent Convention and of the PCT

☒ OA **OAPI Patent:** BF Burkina Faso, BJ Benin, CF Central African Republic, CG Congo, CI Côte d'Ivoire, CM Cameroon, GA Gabon, GN Guinea, ML Mali, MR Mauritania, NE Niger, SN Senegal, TD Chad, TG Togo, and any other State which is a member State of OAPI and a Contracting State of the PCT *(if other kind of protection or treatment desired, specify on dotted line)* .....

National Patent *(if other kind of protection or treatment desired, specify on dotted line)*:

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☒ TT Trinidad and Tobago .....
☒ UA Ukraine .....
☒ UG Uganda .....
☒ US United States of America .....
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In addition to the designations made above, the applicant also makes under Rule 4.9(b) all designations which would be permitted under the PCT except the designation(s) of _____.
The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. *(Confirmation of a designation consists of the filing of a notice specifying that designation and the payment of the designation and confirmation fees. Confirmation must reach the receiving Office within the 15-month time limit.)*

Box No. VI PRIORITY CLAIM Further priority claims are indicated in the Supplemental Box ☐

The priority of the following earlier application(s) is hereby claimed:

Country *(in which, or for which, the application was filed)*	Filing Date *(day/month/year)*	Application No.	Office of filing *(only for regional or international application)*
item (1) SWEDEN	07 07 1995 7 JULY 1995	9502499-8	
item (2)			
item (3)			

Mark the following check-box if the certified copy of the earlier application is to be issued by the Office which for the purposes of the present international application is the receiving Office (a fee may be required):

[X] The receiving Office is hereby requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) identified above as item(s): 1

Box No. VII INTERNATIONAL SEARCHING AUTHORITY

Choice of International Searching Authority (ISA) *(If two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used):* ISA / SE

Earlier search *Fill in where a search (international, international-type or other) by the International Searching Authority has already been carried out or requested and the Authority is now requested to base the international search, to the extent possible, on the results of that earlier search. Identify such search or request either by reference to the relevant application (or the translation thereof) or by reference to the search request:*

Country (or regional Office): Date *(day/month/year)*: Number:

Box No. VIII CHECK LIST

This international application contains the following number of sheets:

1. request	3	sheets
2. description	7	sheets
3. claims	1 [2]	sheets
4. abstract	1	sheets
5. drawings	1	sheets
Total	13 [14]	sheets

This international application is accompanied by the item(s) marked below:

1. ☐ separate signed power of attorney
2. ☐ copy of general power of attorney
3. ☐ statement explaining lack of signature
4. ☐ priority document(s) *identified in Box No. VI as item(s):*
5. [X] fee calculation sheet
6. ☐ separate indications concerning deposited microorganisms
7. ☐ nucleotide and/or amino acid sequence listing (diskette)
8. ☐ other *(specify)*:

Figure No. _____ of the drawings (if any) should accompany the abstract when it is published.

Box No. IX SIGNATURE OF APPLICANT OR AGENT

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).

Lennart Karlström
Representative of the applicant

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1. Date of actual receipt of the purported international application: 28 -06- 1996
2. Drawings: [X] received: ☐ not received:
3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:
4. Date of timely receipt of the required corrections under PCT Article 11(2):
5. International Searching Authority specified by the applicant: ISA / SE
6. ☐ Transmittal of search copy delayed until search fee is paid

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Date of receipt of the record copy by the International Bureau: 29 JULY 1996 (29.07.96)

Arrangement for wireless communications

Anordning för trådlös kommunikation

Tekniskt område

Föreliggande uppfinning hänför sig till en anordning för trådlös kommunikation med inbyggd integrerad elektronik, vilken anordning ansluts till en värdenhet via ett anslutningsorgan. Mera specifikt avses en anordning som avlastar ansluten värdenhet från kontextomkopplingar (context switching), onödig bearbetning av störsignaler och arbetskrävande avbrottsrutiner vid direkt trådlöst informationsutbyte på relativt korta avstånd mellan värdenheter via anordningar enligt uppfinningen.

Teknikens ståndpunkt

Kända anordningar för trådlös kommunikation med direktöverföring av signaler mellan kommunikationsenheter - d v s utan mellanliggande aktiva överföringssystem såsom mobiltelesystem för bearbetning eller vidarebefordran av signaler, såsom PC eller annan värddator, skrivare, faxutrustning eller andra kommunikationsenheter - innefattar utrustningen för trådlös överföring av data, exempelvis IR-, radio- eller ultraljudsutrustning. Denna utrustning styrs och kontrolleras i sin tur av i nämnda kommunikationsenheter befintliga kommunikationsprotokoll, felrättningsrutiner samt eventuella rutiner för signalstörningsfiltrering av trådlöst överförda signaler.

Vidare förstås att exempelvis ett mobiltelesystem inte är gångbart för informationsöverföring mellan exempelvis anordningar där kommunikationen ofta skall ske ögonblickligen och med stora datamängder och höga hastigheter. Det vore ohållbart att invänta access till ett mobiltelesystem för överföringen. Ofta finns inga lediga kanaler och trafiken över mobiltelesystem varierar med dygnet.

Sådana, i kommunikationsenheter integrerade protokoll, rutiner och hårdvara för den trådlösa överföringen kräver mycket datorkraft, som stjäl minnesutrymme och tid för annan i kommunikationsenheter pågående bearbetning, mottagna signaler skall ofta omvandlas till ASCII-kod eller andra standardiserade alfanumeriska teckenkoder med styrtecken.

Dessutom, i kommunikationsenheter med integrerad trådlös kommunikation, arbetar mottagaren för trådlöst överförda signaler kontinuerligt med att tolka yttre störningar och brus, varvid kommunikations- eller värdenheten oavbrutet och i onödan får arbeta med tolkning, även om signalerna visar sig vara brus. Sådana störnings- och bruskällor kan exempelvis utgöras av fjärrkontroller till annan apparatur, såsom till TV-apparater, belysningskontroll, trådlösa telefoner etc.

I befintliga kända anordningar för trådlös kommunikation utgör ovanstående ett problem med avseende på snabb och effektiv informationsöverföring.

Sammanfattning av uppfinningen

Föreliggande uppfinning avser att lösa ovanstående problem på ett ändamålsenligt sätt vad beträffar snabbhet och effektivitet vid direkt kommunikation mellan kommunikationsenheter, utan bearbetning via mellanliggande aktiva länksystem som vidarebefordrar signaler, vid digital dataöverföring mellan kommunikationsenheter.

En första alternativ utföringsform av uppfinningen utgörs av att ett organ för signalomvandling i anordningen endast används för störningsfiltrering av mottagna trådlöst sända signaler (pulser), varvid protokoll för kommunikation innefattas i den värdenhet som anordningen är ansluten till.

I en andra alternativ utföringsform av uppfinningen avses att åstadkomma en separat, vid trådlös överföring, extern anordning som genomför all signalbehandling externt från en värdenhet, varvid endast signaler mellan värdenheten och föremålet för uppfinningen överförs i form av alfanumeriska koder med styrtecken, företrädesvis binärt.

Det är även ett syfte med uppfinningen att en anordning enligt uppfinningen ansluts till en värdenhet via värdenhetens standard in- och utportar.

Ännu ett syfte med uppfinningen är att en värdenhet ansluten till anordningen enligt uppfinningen kan upprätthålla kommunikation mellan andra externa enheter på vanligt vis, exempelvis via dess lokala nätverksanslutning via anslutningsorgan, varvid den trådlösa överföringen kan användas då så är tillämpbart, utan att övrig kommunikation störs eller fördröjs.

Uppfinningens syften uppnås med en anordning för trådlös kommunikation med inbyggd integrerad elektronik, vilken anordning ansluts till en värdenhet via anslutningsorgan.

Anordningen innefattar processorstyrd integrerad elektronik med sändarorgan och mottagarorgan, vilka organ upprättar en direkt överföringslänk mot andra organ för trådlös pulsutsändning respektive -mottagning, filterorgan för bortfiltrering av störddata och brus, organ för signalomvandling och in- och utportar för anslutning via anslutningsorgan till värdenheten. Anordningen med filterorganet arbetar som en buffert mot värdenheten i det att värdenheten via anslutningsorgan endast mottar och bearbetar data avsett för värdenheten.

Vidare kan anordningen i en utföringsform innefatta protokollstyrning för sändning och mottagning av data mellan interagerande anordningar och mellan värdenheten, varvid anordningen omvandlar mottaget trådlöst utsänt data till en alfanumerisk teckenkod med ev styrtecken för överföring till värdenheten respektive omvandlar från värdenheten mottagen alfanumerisk teckenkod med ev styrtecken till pulser för trådlös utsändning. På så sätt arbetar anordningen autonomt från värdenheten ifråga om den trådlösa överföringen och dess signalomvandling .

En värdenhet med ansluten anordning använda anordningen på intermittent basis och kontinuerligt andra befintliga nätverksanslutningar eller att en värdenhet med ansluten anordning beslutar när och i vilken omfattning anordningen används i relation till andra befintliga nätverksanslutningar.

Som ett alternativ kan anordningen utgöra en värdenhets enda kommunikationsväg för extern kommunikation.

Vidare är det föredraget att anordningen är bärbar, om den inte integreras i en värdenhet, och kan anslutas till en värdenhet via värdenhetens och anordningens standard I/O-portar, utan att värdenheten behöver kompletteras med programvara för trådlös kommunikation.

Kortfattad beskrivning av ritningsfigurer

Fortsättningsvis hänvisas till bilagda figurer med tillhörande text för en mer detaljerad beskrivning av föreliggande uppfinning, där;

Fig. 1 schematiskt illustrerar en kommunikationslänk för trådlös överföring av digitalt data med anordningen enligt föreliggande uppfinning som en svart låda; och

Fig. 2 illustrerar på blockschema form en kommunikationslänk för trådlös överföring av digitalt data enligt föreliggande uppfinning.

Detaljerad beskrivning av föredragna utföringsformer

För att lösa ovanstående problem och för att uppnå syftena med föreliggande uppfinning används en helt eller delvist externt från värdkommunikationsenheter arbetande anordning, vilken närmare beskrivs nedan.

Fig. 1 illustrerar därvid schematiskt en kommunikationslänk 9 för direkt trådlös överföring av digitalt data, med två anordningar 12 enligt föreliggande uppfinning som svarta lådor (black boxes) kopplad till en kommunikationsenhet 10 via ett anslutningsorgan, här en datakabel 14.

Med direkt överföring förstås här att inga mellanliggande aktiva system mottar utsända signaler och vidarebefordrar dem till avsedd mottagare. Aktiva system såsom mobiltelesystem innebär att överföring av data åstadkommes via mellansystem såsom basstationer med växelenheter för vidarebefordran till mottagaren, vilket även tillför extra kostnader för utnyttjande av mobiltelesytemet. Föreliggande uppfinning avser exempelvis att två datorer, som ofta befinner sig på relativt kort avstånd från varandra, kommunicerar med varandra, ofta i samma rum, varför direkt kommunikation mellan datorerna via ett aktivt mellansystem eller en aktiv mellanlänk endast tillför onödiga kostnader i utrustning, abonnemangsavgifter etc och avsevärt högre belastning på det aktiva systemet som ofta har begränsat antal kanaler. Således upprättar sändare och mottagare i kommunicerande

anordningar enligt uppfinningen en egen direkt kommunikationslänk, som kan utnyttja passiva reflektorer för överföringen, exempelvis väggar, golv, tak, paraboler, speglar etc. Föreliggande uppfinning medger så gott som omedelbar access till en dataöverföring, speciellt om accesstiderna jämförs med de som förekommer i mobiltelesammanhang. Vidare förstås att ett mobiltelesystem inte är gångbart för informationsöverföring mellan exempelvis anordningar där kommunikationen ofta skall ske ögonblickligen och med stora datamängder och höga hastigheter. Det vore ohållbart att invänta access till ett mobiltelesystem för överföringen. Ofta finns inga lediga kanaler och trafiken över mobiltelesystem varierar med dygnet.

Dessutom är inomhustäckningen för mobiltelesystem diskutabel, speciellt i utrymmen som saknar fönster. Ytterligare utgör föreliggande uppfinning en förbättring av redan existerande trådlösa överföringssystem, som inte utnyttjar några aktiva mellan system.

Anslutningsorganet kan vara; en datakabel med standard kontakter för anslutning till socklar, lödat för integrerad anslutning av värdenhet 10, adaptrar för direkt, integrerad, anslutning till en värdenhet 10 etc. Anordningen 12 kan således även integreras i en värdenhet på ett för en fackman känt sätt via anslutningsorgan 14. Länken 9 är avsedd för data-överföring mellan anordningarna 12, vilket indikeras av de enkelriktade pilarna i figuren. Avståndet mellan anordningarna 12 kan variera mellan ca 0,5 m till flera 100 m, indikerat via den dubbelriktade pilen i fig. 1. Anordningarna 12 behöver inte nödvändigtvis vara direkt synliga för varandra, utan reflektorer (ej visade), speglar eller andra reflekterande ytor, kan användas för reflektion av ljus, radiovågor, ultraljud etc.

Sändarenheter för den trådlösa överföringen kan vara riktade, mer eller mindre divergent anpassade eller rundstrålande.

Kommunikationen mellan anordningar 12 kan vara dubbelriktad eller enkelriktad i båda riktningar, såsom duplex-, full duplex- och simplexkommunikation.

De båda anordningarna 12 både sänder och tar emot data i form av pulser såsom ljus, radio- eller ultraljudspulser beroende på vilken teknik som används för den trådlösa överföringen. I fråga om ljus ligger infrarött ljus (IR-ljus) närmast tillhands, men andra tekniker för sändning av ljus på optisk väg är för den skull inte uteslutna.

Vidare är anordningar 12 integrerade att filtrera bort störningar och brus i överföringen via ett internt filtreringsprogram eller via intern hårdvara så att felaktig information sorteras bort eller felrättas via kända sådana koder för överföring av trådlöst digitalt data, exempelvis genom kända CRC-koder (Cyclic Redundancy Codes) för felfri överföring av mottaget data till värdenheter 10.

En värdenhet 10 kan utgöras av en PC, annan värddator, skrivare eller andra

kommunikationsenheter innefattande integrerad processorbaserad elektronik för kommunikation med andra enheter. Härvid kan nämnda kommunikationsenheter 10 upprätthålla informationsöverföring på vanligt sätt via kabel eller annat anslutningsorgan i t ex ett nätverk av enheter 10, varvid en ansluten anordning 12 kan användas intermittent för dataöverföring då så är påkallat. Sistnämnda intermittenta användning kan påkallas av ett otal anledningar, exempelvis för överföring av data till annat nätverk, ersätta modemöverföring mellan fristående PC-enheter, användas för specifika styrfunktioner av perifer kringutrustning etc.

Informationsutbyte mellan extern anordning 12 och värdenhet 10 genom datakabel 14 kan ske vi t ex en seriell RS232 kanal eller annan lämplig standard seriell eller parallell datakanal. Kabeln 14 ansluts mellan värdenhet 10 och anordning 12 via en eller flera standard seriella eller parallella in- och utportar (I/O-portar).

Nedan hänvisas till fig. 2, som på blockshema form illustrerar en kommunikationslänk 9, med två anordningar 12 för trådlös överföring av digitalt data enligt föreliggande uppfinning.

Anordningen 12 enligt uppfinningen består av integrerad processorbaserad elektronik med i processorenheten (CPU-enhet) integrerat filterorgan 26, programvara eller hårdvara, för dataflödesfiltrering, felrättning och protokollhantering. CPU-enheten har ett sändarorgan 22 anslutet och ett mottagarorgan 24 via filterorganet 26. Filterorganet 26 kan naturligtvis även förekomma som ett mot CPU-enheten externt organ, anslutet mellan mottagarorganet 24 och CPU-enheten 20. Vidare är CPU-enheten ansluten till ett organ för signalomvandling 28, som omvandlar signaler på en form avsedd för överföring av data mellan anordningar 12 resp värdenheter 10.

För att kommunicera med omvärlden finns som brukligt I/O-portar på CPU-enheten (ej visat) till vilka kabelförbindelsen 14 ansluts via en sockel (ej visad) av någon lämplig standardiserad sort.

Enheter och organ och den använda kommunikationstekniken mellan dessa, som innefattas i anordningen 12, är i och för sig välkända inom föreliggande teknikområde, och anses därför inte nödvändiga att i detalj beskrivas för att en fackman skall kunna utöva uppfinningen. Däremot är kombinationen av organ och enheter utlokaliserade till en för en värdenhet 10 extern anordning 12 unik, varvid värdenhet 10 i en utföringsform till stor del avlastas tidskrävande sänd- och mottagningsuppgifter som belastar avbrottsrutiner och "context switching" (databegrepp för omkoppling mellan arbetsrutiner) för kommunikationsenheter 10 som är CPU-baserade, och i en andra utföringsform helt avlastas dessa. I en första utföringsform av uppfinningen innefattar anordningen 12 filterorganet 26 med filtreringsprotokoll men saknar de kommunikationsprotokoll som värdenheter 10 vanligen kommunicerar med

externt, d v s värdenheter måste fortsättningsvis även innefatta sådana protokoll för att kunna tillgodogöra sig föremålet för uppfinningen.

Organet för bortfiltrering 26 av störddata utgör en väsentlig del av uppfinningen. Det bör förstås att en kommunikationsenhet 10 som kommunicerar trådlöst enligt nuvarande teknik hela tiden utsätts för att tolka störbrus från apparater i dess omgivning såsom från TV-fjärrkontroller, radiosändande apparatur t ex mobiltelefoner etc. Nämnda innebär att enheten 10 oavbrutet måste tolka till mottagaren ankommande signaler och avgöra om det är relevant data eller störddata. Med en anordning 12 innefattande filterorgan 26 för bortsortering av störddata avlastas en värdenhet 10 helt och hållet detta och kan så att säga vila i väntan på ankommande färdigfiltrerat relevant data.

I en andra utföringsform innefattar anordningen 12 även de ovan nämnda kommunikationsprotokoll, som vanligen en värdenhet för anordningen 12 innefattar och arbetar således helt autonomt från värdenheter 10 ifråga om signalbearbetning av data för utsändning och mottagning.

Med en anordning 12 enligt den andra utföringsformen innefattas protokollhantering av data för kända alfanumeriska teckenkoder med styrtecken i anordningen 12. Således kan en värdenhet skicka och motta, via datakabel 14, alfanumeriska textfiler med styrtecken, t ex ASCII-tecken, direkt till/från den externa anordningen, utan att behöva bearbeta mottaget data mer än vad som behövs för den interna bearbetningen av data.

Som beskrivits kan värdenheter 10 fortfarande kommunicera via vanliga nätverksanslutningar, varvid specifika tillämpningar kan medföra, att delar av denna nätverkskommunikation vid behov kan ske via den externa anordningen 12 för trådlös kommunikation mellan värdenheter 10.

När en värdenhet 10 vill nå en annan skickas informationen exempelvis via en seriell RS232 kanal till den andra värdenhetens inport. Den sändande anordningen omvandlar den från dess värdenhet ankomna information till pulståg av elektromagnetiska signaler eller i förekommande fall pulståg av akustiska signaler och emitterar pulstågen via den trådlösa länken till en liknande anordning 12, som är målet för kommunikationen. De mottagna pulstågen hamnar via mottagare 24 i filtreringsorganet 26 för bortfiltrering av störningar och brus och kontroll av att informationen är korrekt. Vid obestämbar mottagen information sorteras denna bort och når aldrig värdenheten 10. De båda med värdenheter kommunicerande anordningarna 12 har därvid ett internt protokoll för dataöverföring. Anordningarnas 12 arbetssätt blir därför unikt och de anslutna värdenheterna 10 belastas inte extra, utan länken 9 med anordningar 12 sköter om det extra arbete som behövs för trådlös dataöverföring.

Om anordningen 12 är utförd enligt det andra alternativet anordningen görs den

företrädesvis bärbar och kan anslutas till en värdenhet 10 via värdenhetens och anordningens 12 standard I/O-portar, utan att värdenheten behöver kompletteras med programvara för trådlös kommunikation.

Utföringsformer enligt ovan är inte menade, att begränsa föreliggande uppfinning till dessa, utan mera för att åskådliggöra exemplifierande tillämpningar för en fackman inom teknikområdet. Det är således endast bilagda patentkravs avfattning, som begränsar antalet utföringsformer för en fackman.

Patentkrav

1. Anordning (12) för trådlös kommunikation med inbyggd integrerad elektronik, vilken anordning (12) ansluts till en värdenhet (10) via anslutningsorgan (14), k ä n n e t e c k n a d av att anordningen (12) innefattar processorstyrd (20) integrerad elektronik med sändarorgan (22) och mottagarorgan (24), vilka organ (22, 24) upprättar en direkt överföringslänk (9) mot andra organ (22, 24) för trådlös pulsutsändning respektive -mottagning, filterorgan (26) för bortfiltrering av stördata och brus, organ (28) för signalomvandling och in- och utportar för anslutning via anslutningsorgan (14) till värdenheten (10), varvid anordningen med filterorganet (26) arbetar som en buffert mot värdenheten (10) i det att värdenheten via anslutningsorgan (14) endast mottar och bearbetar data avsett för densamma.

2. Anordning enligt krav 1, k ä n n e t e c k n a d av att den innefattar protokollstyrning för sändning och mottagning av data mellan interagerande anordningar (12) och mellan värdenheten (10), varvid anordningen (12) omvandlar mottaget trådlöst utsänt data till en alfanumerisk teckenkod med ev styrtecken för överföring till värdenheten respektive omvandlar från värdenheten mottagen alfanumerisk teckenkod med ev styrtecken till pulser för trådlös utsändning, varvid anordningen (12) arbetar autonomt från värdenheten (10) ifråga om den trådlösa överföringen och dess signalomvandling (28).

3. Anordning enligt krav 1 och 2, k ä n n e t e c k n a d av att anordningen (12) med ansluten värdenhet (10) används på intermittent basis och att värdenheten (10) kontinuerligt använder andra befintliga nätverksanslutningar.

4. Anordning enligt krav 1 och 2, k ä n n e t e c k n a d av att ansluten värdenhet (10) beslutar när och i vilken omfattning anordningen (12) används i relation till andra befintliga nätverksanslutningar.

5. Anordning enligt krav 1 och 2, k ä n n e t e c k n a d av att anordningen (12) utgör en värdenhets (10) enda kommunikationsväg för extern kommunikation.

6. Anordning enligt något av kraven 2-5, k ä n n e t e c k n a d av att anordningen är bärbar och kan anslutas till en värdenhet (10) via värdenhetens och anordningens (12) standard I/O-portar, utan att värdenheten behöver kompletteras med programvara för trådlös kommunikation.

7. Anordning enligt något av föregående krav, k ä n n e t e c k n a d av att den integreras i en värdenhet via anslutningsorgan (14).

Sammandrag

Uppfinningen avser en anordning (12) för direkt trådlös kommunikation med inbyggd integrerad elektronisk intelligens, vilken anordning (12) ansluts till en värdenhet (10) via ett anslutningsorgan (14). Mera specifikt avses en anordning som avlastar ansluten värdenhet från kontextomkopplingar (context switching), onödig bearbetning av störsignaler och arbetskrävande avbrottsrutiner vid trådlöst informationsutbyte mellan värdenheter (10) via anordningar (12).

(Fig. 1)

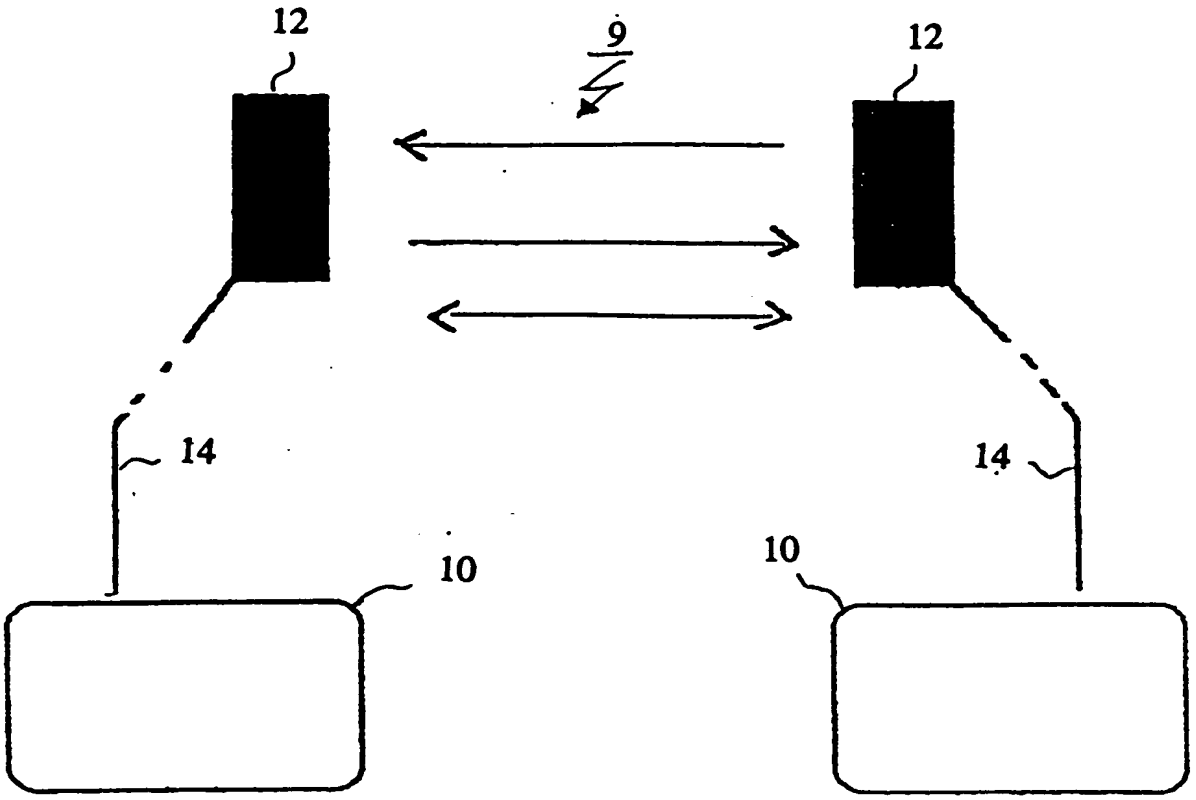
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Fig. 1

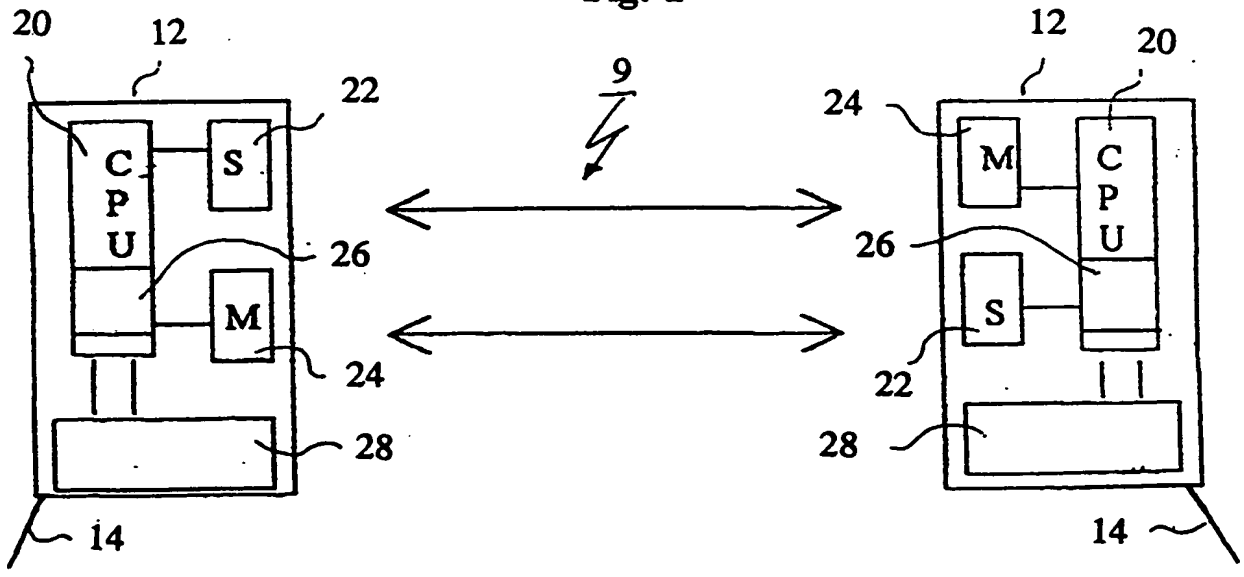
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Fig. 2

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
P32984PCOO/UDO		
International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/SE96/00865	28.06.1996	07.07.1995
International Patent Classification (IPC) or national classification and IPC6		
H 04 Q 7/32, H 04 M 11/06		
Applicant		
DATASOFT SYSTEM AB ET AL		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

   ☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of _____ sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the report
   - II ☐ Priority
   - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☐ Lack of unity of invention
   - V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - VI ☒ Certain documents cited
   - VII ☐ Certain defects in the international application
   - VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
07.02.1997	01.11.1997
Name and mailing address of the IPEA/SE Patent- och registreringsverket Box 5055 S-102 42 STOCKHOLM Telex 17978 PATOREG-S Facsimile No. 08-667 72 88	Authorized officer Friedrich Kühn Telephone No. 08-782 25 00

Form PCT/IPEA/409 (cover sheet) (January 1994)

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/SE96/00865

I. Basis of the report

1. This report has been drawn on the basis of *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.)*:

☒ the international application as originally filed.

☐ the description, pages _____ , as originally filed,
pages _____ , filed with the demand,
pages _____ , filed with the letter of _____ ,
pages _____ , filed with the letter of _____ .

☐ the claims, Nos. _____ , as originally filed,
Nos. _____ , as amended under Article 19,
Nos. _____ , filed with the demand,
Nos. _____ , filed with the letter of _____ ,
Nos. _____ , filed with the letter of _____ .

☐ the drawings, ~~sheets~~/fig _____ , as originally filed,
~~sheets~~/fig _____ , filed with ~~the demand~~
~~sheets~~/fig _____ , filed with the letter of _____ ,
~~sheets~~/fig _____ , filed with the letter of _____ .

2. The amendments have resulted in the cancellation of:

☐ the description, pages _____
☐ the claims, Nos. _____
☐ the drawings, ~~sheets~~/fig _____

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the supplemental Box (Rule 70.2(c)).

4. Additional observations, if necessary:

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/SE96/00865

V. Resoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-7	YES
	Claims		NO
Inventive step (IS)	Claims		YES
	Claims	1-7	NO
Industrial applicability (IA)	Claims	1-7	YES
	Claims		NO

2. Citations and explanations

The claimed invention relates to an arrangement for direct wireless communication, said arrangement containing integrated electronics and being connected to a host unit by means of a data cable. The invention intends to relieve the connected host unit from measures that are only related to the wireless interchange of information between the units. For this purpose the arrangement contains transmitter and receiver means, conversion and connection means, and filter means that filter out disturbance data and work as a buffer against the host unit.

The following documents have been cited in the International Search Report:

D1: EP 0 555 992 A1
D2: EP 0 632 636 A1
D3: EP 0 655 873 A2

D1 discloses a data adapter for a radio telephone capable of supporting the short message service and contains coupling means and means for processing data that has been transferred to the adapter from the mobile phone or an external data unit (see figure 1).

D2 discloses a device for coupling a mobile phone to a data terminal. The adapter has at least two interfaces and means for converting and processing data that has been received from the mobile unit (column 2, line 43 - column 3, line 32). The mobile unit is part of a cordless telephone system and connected to a base station via a transmission link.

D3 discloses an adapter for data transmission to and from a radio telephone that allows a data terminal to use the services of a cellular network. The adapter contains means for translating signals, and first and second coupling means for coupling the translator to the radio telephone and the data terminal respectively.

.../...

Supplemental Box
(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: V

An arrangement as claimed in claim 1 is not considered to involve an inventive step when compared to the system 'mobile telephone and data adapter' disclosed in D1 or D2. Similar to the claimed arrangement, the disclosed systems are applied to handle the wireless communication between two host units. Said systems contain integrated electronics and signal processing means also claimed for the arrangement in claim 1. However, the wireless communication systems in D1 or D2 refer to mobile phones while the claimed invention refers to an arrangement providing a direct transmission link, i.e. without any intermediate systems such as base stations. This difference is not considered to involve an inventive step, because it is considered to be obvious for a person skilled in the art to apply, instead of a mobile phone, transceiver means comprising a direct transmission link. Such systems are considered to be common knowledge.

With reference to claim 2, the arrangement includes means for converting received wireless-transmitted data to an alphanumerical character code and vice versa. This is considered to be obvious for a person skilled in the art when taking into account document D1, disclosing a system that applies the short message service. Therefore, what has been disclosed in claim 2 is not considered to involve an inventive step.

Claims 3 and 4 relate more to the connected host unit instead of the claimed arrangement, particularly to the usage of other existing network connections. In claim 5, the arrangement is the only communication path of the host unit. These are considered to be only suitable measures that do not involve an inventive step.

Claims 6 and 7 relate to constructional details that are obvious for a person skilled in the art.

The invention is considered to have industrial applicability.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/SE96/00865

VI. Certain documents cited

1. Certain published documents (Rule 70.10)

Application No. Patent No.	Publication date *(day/month/year)*	Filing date *(day/month/year)*	Priority date (valid claim) *(day/month/year)*
EP 0669746 A1	30.08.1995	22.02.1995	28.02.1994

2. Non-written disclosures (Rule 70.9)

Kind of non-written disclosure	Date of non-written disclosure *(day/month/year)*	Date of written disclosure referring to non-written disclosure *(day/month/year)*

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference P32984PCOO/UDO	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/SE96/00865	International filing date (day/month/year) 28.06.1996	Priority date (day/month/year) 07.07.1995
International Patent Classification (IPC) or national classification and IPC H 04 Q 7/32, H 04 M 11/06		
Applicant DATASOFT SYSTEM AB ET AL		

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- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☒ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
07.02.1997	01.11.1997
Name and mailing address of the IPEA/SE Patent- och registreringsverket Box 5055 S-102 42 STOCKHOLM Facsimile No. 08-667 72 88 Telex 17978 PATOREG-S	Authorized officer Friedrich Kühn Telephone No. 08-782 25 00

Form PCT/IPEA/409 (cover sheet) (January 1994)

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/SE96/00865

I Basis of the report

1. This report has been drawn on the basis of *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.)*:

☒ the international application as originally filed.

☐ the description, pages _____, as originally filed,
pages _____, filed with the demand,
pages _____, filed with the letter of _____,
pages _____, filed with the letter of _____

☐ the claims, Nos. _____, as originally filed,
Nos. _____, as amended under Article 19,
Nos. _____, filed with the demand,
Nos. _____, filed with the letter of _____,
Nos. _____, filed with the letter of _____

☐ the drawings, ~~sheets~~/fig _____, as originally filed,
~~sheets~~/fig _____, filed with the demand
~~sheets~~/fig _____, filed with the letter of _____
~~sheets~~/fig _____, filed with the letter of _____

2. The amendments have resulted in the cancellation of:

☐ the description, pages _____
☐ the claims, Nos. _____
☐ the drawings, ~~sheets~~/fig _____

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the supplemental Box (Rule 70.2(c)).

4. Additional observations, if necessary:

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/SE96/00865

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-7	YES
	Claims		NO
Inventive step (IS)	Claims		YES
	Claims	1-7	NO
Industrial applicability (IA)	Claims	1-7	YES
	Claims		NO

2. Citations and explanations

The claimed invention relates to an arrangement for direct wireless communication, said arrangement containing integrated electronics and being connected to a host unit by means of a data cable. The invention intends to relieve the connected host unit from measures that are only related to the wireless interchange of information between the units. For this purpose the arrangement contains transmitter and receiver means, conversion and connection means, and filter means that filter out disturbance data and work as a buffer against the host unit.

The following documents have been cited in the International Search Report:

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D2: EP 0 632 636 A1
D3: EP 0 655 873 A2

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D2 discloses a device for coupling a mobile phone to a data terminal. The adapter has at least two interfaces and means for converting and processing data that has been received from the mobile unit (column 2, line 43 - column 3, line 32). The mobile unit is part of a cordless telephone system and connected to a base station via a transmission link.

D3 discloses an adapter for data transmission to and from a radio telephone that allows a data terminal to use the services of a cellular network. The adapter contains means for translating signals, and first and second coupling means for coupling the translator to the radio telephone and the data terminal respectively.

.../...

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/SE96/00865

Supplemental Box
(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of V

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Claims 3 and 4 relate more to the connected host unit instead of the claimed arrangement, particularly to the usage of other existing network connections. In claim 5, the arrangement is the only communication path of the host unit. These are considered to be only suitable measures that do not involve an inventive step.

Claims 6 and 7 relate to constructional details that are obvious for a person skilled in the art.

The invention is considered to have industrial applicability.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/SE96/00865

VI. Certain documents cited

1. Certain published documents (Rule 70.10)

Application No. Patent No.	Publication date (day/month/year)	Filing date (day/month/year)	Priority date (valid claim) (day/month/year)
EP 0669746 A1	30.08.1995	22.02.1995	28.02.1994

2. Non-written disclosures (Rule 70.9)

Kind of non-written disclosure	Date of non-written disclosure (day/month/year)	Date of written disclosure referring to non-written disclosure (day/month/year)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE 96/00865

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: H04Q 7/32, H04M 11/06
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: H04M, H04Q, H04B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPAT JAPIO

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 555992 A1 (NOKIA MOBILE PHONES LTD.), 18 August 1993 (18.08.93), see the claims	1-7
X	EP 0632636 A1 (HAGENUK GMBH), 4 January 1995 (04.01.95), column 2, line 43 - column 3, line 32	1-7
A	EP 0655873 A2 (NOKIA MOBILE PHONES LTD.), 31 May 1995 (31.05.95), page 3, line 34 - page 4, line 4, abstract	1-7
P,A	EP 0669746 A1 (SIEMENS AKTIENGESELLSCHAFT), 30 August 1995 (30.08.95), column 3, line 56 - column 5, line 3	1-7

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier document but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
13 November 1996	19 -11- 1996
Name and mailing address of the ISA/ Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86	Authorized officer Göran Magnusson Telephone No. +46 8 782 25 00

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Information on patent family members

28/10/96

International application No.
PCT/SE 96/00865

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP-A1- 555992	18/08/93	NONE	
EP-A1- 0632636	04/01/95	NONE	
EP-A2- 0655873	31/05/95	FI-A- 935347	31/05/95
EP-A1- 0669746	30/08/95	DE-A,C- 4406507	31/08/95